Project Summary

US Army Engineer
Research and Development Center
Waterways Experiment Station

March 2000

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Title: Engineering Geology Assessment of Belle Fontaine Road, Haiti

Principal Investigator: Joe Dunbar, (601) 634-3315

Objective: Landslide hazard assessment and geotechnical support

Approach:

A site visit was conducted by Mr. Joe Dunbar, Research Geologist, Geotechnical Laboratory, US Army Engineer and Development Center, USAE Waterways Experiment Station, Vicksburg, MS, to Haiti during the period of 31 January to 4 February 2000. Work conducted during this assignment was in support of the US Agency for International Development (USAID), Haiti, Economic Growth Office, and their contractors as part of the US Army Corps of Engineers (USACE) Participating Agency Support Agreement (PASA) initiated in 1999 following the destruction caused by Hurricane Georges. Hurricane Georges was responsible for significant damage to the roads within the Belle Fontaine region, including minor landslide activity (Colon, 1999).

The purpose of the TDY assignment to Haiti was to provide engineering geologic support to evaluate alternatives for the Belle Fontaine road, to assess landslide hazards for the proposed route, and to make recommendations for mitigating existing slides on the road. The scope of this study was limited to a brief review of available geologic data, a site reconnaissance of the Belle Fontaine area, and participation in several meetings with USAID and their support contractors. The focus for meetings was to review road alternatives and to evaluate preliminary design specifications for the final route.

Improvements to the existing road were considered to be more cost effective in the short term than extensive construction required for building a new road from the ridge crest to the river crossing at Trois Passes. Costs to improve the existing roadway will depend on the final engineering design. This design is scheduled for completion by the engineering contractor at the end of February.

In general, the potential for landslide activity in the Belle Fontaine area is significant because of mountainous terrain and lack of vegetation on steep slopes due to deforestation. However, the potential for landslide activity in this area is probably less severe than other parts of this region through which travel is required to reach the Belle Fontaine roadway. An accurate assessment of landslide hazards in this region, particularly in the mountain and mission segments beyond the observed road area, would require detailed examination of recent aerial photography or satellite imagery.

Past landslide activity was identified approximately midway in the Riviere de l'Est Valley. The coarse texture of river bed sediments and absence of any debris at the base of the rock face indicates the high energy conditions within this part of the Riviere de l'Est Valley. The contractor has identified this unstable area in their engineering study. Consequently, they have routed the road away from this part of the river valley.

For the mountain and mission segments of the road, rock falls are a major hazard to motorists and pedestrians. Because of the steep slopes, control of surface drainage is important to prevent further erosion of the roadway and the slopes upon which the road is constructed. In addition, drainage control is important for the ridge road to prevent further uncontrolled erosion. Lack of vegetation due to deforestation contributes to the overall erosion potential and has been responsible for development of major gullies.

In order to assess flooding and damage impacts to the roadway (to accurately forecast flood frequency and magnitude), hydrologic data are needed for this drainage basin. A watershed analysis is needed to identify flood frequency (stage and discharges) for maintaining the road and minimizing the interruption of commerce and trade. The watershed analysis would provide data on sheet and gully flow, and identify locations for stream by-passes to prevent damage to the roadway.

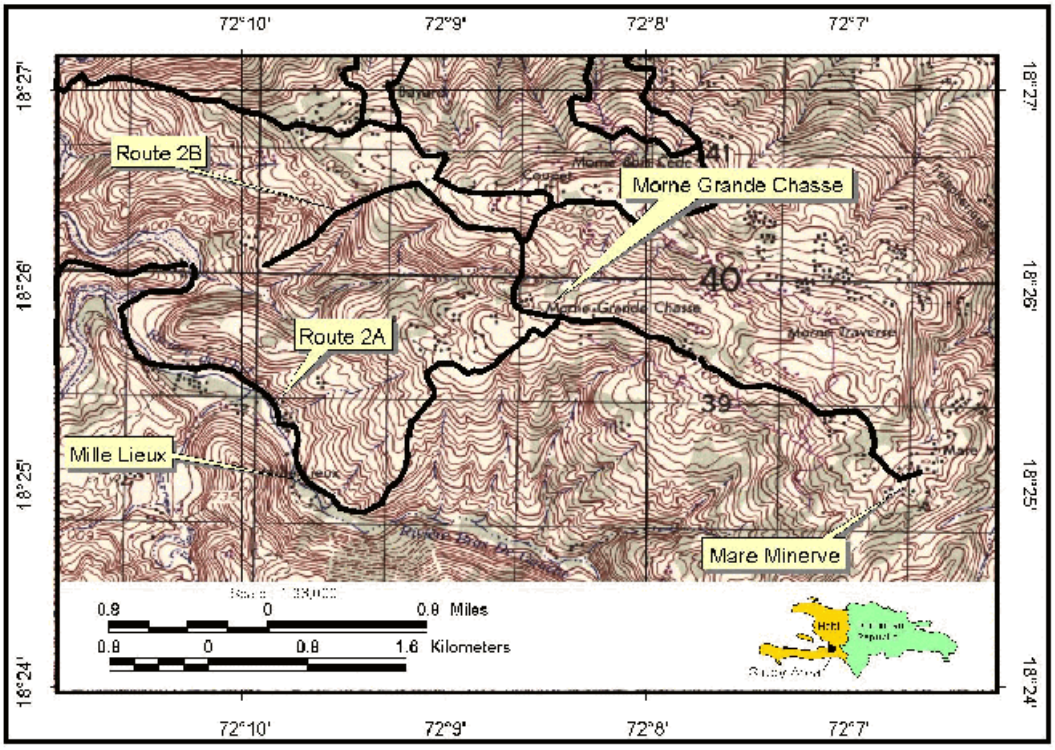

Figure 1. Location map showing steep topography (contours in meters), important place names, and route alternatives for the Belle Fontaine Road (i.e., routes 2A and 2B).